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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/000,824
Filing Date: December 30, 1997
Appellant(s): AMARASEKERA ET AL.

Scott F. Yarnell
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 1, 2005 appealing from the Office action mailed December 1, 2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

A. Claims 17 and 19-24 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants' identification of support for the instant claims are noted, however, the those identified portions of the specification as originally filed do not provide full support for the instant claims in at least two aspects: (i) the formula of the organopolysiloxane, $R_aSiO_{(4-a)/2}$ wherein a has a value of 1.95 to 2.05, and (ii) the range of peroxide, respectively, of claim 17 . Thus, (i) and (ii) are new matter. Applicants have not yet identified the support for the formula organopolysiloxane and the full support of the entire range of peroxide is not found "at least in Examples 1 and 2" as indicated by applicants. Applicants' Examples 1 and 2 can only support two data points at most. Furthermore, applicants can not used what is "commonly known in the art" to support applicants' claims. The claimed limitation must be fully supported by the application as originally filed.

Claim Rejections - 35 USC § 102

A. Claims 1-6, 8-13, 15-17, 19-24 and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsushita et al. (US 5,824,729).

Matsushita's Claims 1-7 and Examples 1 and 2 teach (A) an alkenyl group (vinyl) containing siloxane, (B) an aluminum hydroxide, (C) a silane or siloxane treating agent (vinyltrimethoxysilane of Example 1 and silanol-endblocked dimethylsiloxane-methylvinylsiloxane copolymer oligomer of Example 2), (D) an organoperoxide curing agent, wherein the peroxide is introduced to the composition as a silicone oil paste. In Matsushita's Example 2, a dimethyldichlorosilane treated fumed silica is used. It is noted that the alkenyl group containing siloxane is the silicone polymer, aluminum hydroxide is the single component of antitracking agent and the flame retardant (see lines 15-26 of page 6 of appellants' Specification for the definition), the treating agent is the coupling agent, fumed silica is the reinforcing filler, and the silicone oil is the processing fluid of the instant claims respectively. Therefore, Matsushita's teaching encompasses the instant claims.

Claim Rejections - 35 USC § 103

A. Claims 7,12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. (US 5,824,729).

Matsushita's teaching is relied upon as shown above. Matsushita's Example 2 differs from instant Claim 7 in that Example 2 does not specifically use a silane coupling such as vinyltrimethoxyl silane. However, it would have been obvious for a skilled artisan to employ vinyltrimethoxyl silane of Matsushita's Example 1 to Example 2 to provide a silicone composition since those treating agents are functionally equivalent for modifying the surface of fillers (silica and aluminum hydroxide), thus improve the

bonding between the fillers and the siloxane and provide a cured siloxane composition with improved mechanical properties.

While Matsushita's working examples do not include a coloring agent or heat resistive agent, Matsushita does expressly teach that additional components, such as pigment, reinforcing filler, non-reinforcing filler, internal mold-release agents, heat stabilizers such as rare earth oxide and cerium fatty acid, can be added to the composition (col. 3, lines 37-54).

Thus, it would have been obvious to a skilled artisan at the time the invention was made to employ Matsushita's teaching to prepare a silicone composition by using a vinylalkoxyl silane as the coupling agent and including additional components such as pigment, reinforcing filler, non-reinforcing filler, internal mold-release agents, and/or heat stabilizers such as rare earth oxide and cerium fatty acid to achieve the improved appearance, mechanical properties, heat and flame resistance and/or release property for the silicone composition and in the absence of any showing criticality and unexpected results.

B. Claims 1-17, 19-24 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dams (US 4,355,129) in view of Milbert (US 3,821,140).

Dams teaches a organopolysiloxane (silicone) composition for high voltage insulation (col. 1, lines 30-45) comprising a silicone polymer (col. 1, line 50 to col. 2, line 20), a reinforcing and a non-reinforcing filler (col. 2, lines 21-36), an anti-tracking and flame retardant agent (col. 3, lines 20-28), a coupling agent (col. 2, lines 38-49) , a

curing agent (col. 2, line 62 to col. 3, line 5), a processing fluid of a polydimethylsiloxane free of vinyl groups or a hydroxyl-containing siloxane (col. 2, lines 16-17, and col. 2, lines 43-44), a mold release agent (col. 2, lines 16-17 and col. 3, line 21), a coloring agent (col. 3, lines 32-37), and a heat resistant agent (col. 3, lines 21-23). It is noted that Dams' non-reinforcing filler is the same as an extending filler of the instant claims. It is also noted that the extending filler of the instant claims is an optional component due the limitation of "up to about 20% by weight" of claim 1, under item (f).

In Dams' working example, Table of col. 4, Dams demonstrated a silicone composition comprising a vinyl group containing polydimethylsiloxane (the silicone polymer), fume silica (the reinforcing filler), alumina trihydrate (the antitracking agent and the flame retardant), 2,5-bis(tertiary butyl peroxy)-2,5-dimethylhexane (the curing agent), and a cobalt aluminate blue pigment. Dams' working example differs from the instant claims in that the fume silica is not treated with a coupling agent such as vinyltrimethoxysilane. However, Dams expressly teaches modification of the surface of the filler with a coupling agent such as vinylalkoxysilanes can be done in situ to improve the bonding between the filler and the siloxane. The simplest and most commonly used coupling agent is vinyltrimethoxysilane and vinyltriethoxysilane. Using coupling agent to enhance the compatibility between the siloxane and fillers (silica and alumina trihydrate) are well known and routine practice in industry and coupling agents are taught in all of the cited prior art. The amount of coupling agent can be optimized though routine experimentation and such amount is likely to fall in the range of the instant claims considering the broader range 0.01% to 1% which is conventionally used in the industry.

Thus, it would have been obvious to a skilled artisan at the time the invention was made to employ Dams' teaching to add a processing fluid such as polydimethylsiloxane free of vinyl groups to improve the processability and a coupling agent such as vinyltrimethoxysilane to the siloxane composition to treat the surface of the silica filler in situ to improve bonding between silica filler and the siloxane and in the absence of any showing criticality and unexpected results.

Although Dams' silicone polymer contains dimethyl siloxy, methylvinyl siloxy and alkylhalogenoalkyl siloxy units, Dams does not particularly teach a processing fluid of polysiloxane with terminal groups such as hydroxy groups of the instant claim 33.

Milbert teaches a polysiloxane composition of electric insulation material comprising all the components as claimed in the instant claims except the alumina trihydrate anti-tracking agent (col. 1, line 35 to col. 4, line 10 and Examples). Milbert's Example 1 teaches a silicone composition comprising an alkenyl group containing siloxane and α,ω-di-hydroxy-dimethylsiloxanes which encompass those of the instant claims (col. 4, lines 24 and 45-46).

When the silicone polymer containing both vinyl and alkoxy/hydroxy groups, the silicone polymer can bond with the coupling agent through condensation and free radical polymerization reaction, the silicone polymer also react with the oxide-type filler such as silica directly to enhance the bonding with the filler, thus, enhance the mechanical properties of the cured silicone composition.

Thus, it would have been obvious for a skilled artisan at the time the invention is made to employ Milbert's hydroxyl terminated siloxanes such as α,ω-di-hydroxy-

dimethylsiloxanes to Dams' composition to provide a high voltage insulation material with improved bonding between the silicone polymer and the fillers such as silica and alumina trihydrate and processability and in the absence of any showing of criticality and unexpected results.

(10) Response to Argument

A. Rejection under 35 U.S.C. 112, first paragraph

1. Appellants argue that the claimed peroxide range is expressly disclosed.

Appellants cite, "a composition of 15% silicon polymer and 0.75% curing agent (as provided by the embodiment described in the specification on page 2, lines 19-28) is the same as a composition of 100 weight parts silicone polymer and 5 weight parts curing agent". The examiner disagrees. Appellants' page 2, lines 19-28 discloses the following:

--"(a) from about 15 to about 50%, by weight of the total composition, of silicone polymer;

.....

(e) from about 0.1% to about 5% by weight of the total composition of a curing agent;"--

Since Appellants' disclosure of does not provide the range for the curing agent with the end point of range being 0.75 wt.% which converts to 5 weight by part of curing agent per 100 weight by part of silicone, the new end point limitation of 5 weight by part of curing agent per 100 weight by part of silicone under item (D) of claim 17 is new matter.

Appellants have corrected point out that the amount of the curing agent used in Appellants' Examples 1 and 2 are in the range of claim 17. However, the amounts of

curing agents used in Appellants' Examples 1 and 2 do not overlap with any of the end points of the range of the curing agent of claim 17, thus, the range of the curing agent of claim 17 is new matter.

2. Appellants argue the formula of organopolysiloxane comprising at least 2 silicon-bonded alkenyl groups, $R_aSiO_{(4-a)/2}$ wherein R is a hydrocarbon groups and *a* has a value of 1.95 to 2.05, is implicitly and inherently disclosed in the original disclosed in the original specification.

Appellants assert that their Example 1 provides support for the siloxane formula. This is incorrect. First of all, the methyl and vinyl groups of the siloxane of Example 1 do not support the generic terms of hydrocarbon and alkenyl groups respectively, they only support a single species under hydrocarbon and alkenyl groups of claim 17 respectively. Secondly, the diorganopolysiloxane of Example 1 only provide support a single "*a*" value in the formula of $R_aSiO_{(4-a)/2}$, however, such "*a*" can not even be calculated since the molecular weight of the siloxane is not disclosed. While Appellants' Example 1 might support a single data point in the range of the siloxane formula of claim 17, it would not provide full support for the numerous siloxanes represented by the siloxane of claim 17 under item (A). Therefore, component (A) of claim 17 contains new matter.

Appellants have corrected point out that the siloxanes with "a degrees of polymerization generally in the range from 1,000 to 20,000" disclosed in Matsushita's col. 2, lines 20-23 can be represented by the formula $R_aSiO_{(4-a)/2}$, wherein *a* is in the range of 1.95 to 2.05. The relationship between degrees of polymerization *n* and *a* is

a = {2.0+2.0/(n+1)}. Therefore, when Matsushita's *n* is in the range of 1,000 to 20,000, the corresponding *a* should be {2.0+2.0/[1,000~(20,000+1)]} = 2.002~2.0001, which is in the range of 1.95 to 2.05. The calculation clearly demonstrates that the siloxane represented by the formula $R_aSiO_{(4-a)/2}$ with *a* in the range of 1.95 to 2.05 is much broader than the siloxanes with "a degrees of polymerization generally in the range from 1,000 to 20,000". That is applicant's disclosure of siloxane (page 3, line 20 to page 4, line 5) does not provide full support to siloxane limitation of component (A) of claim 17.

B. Rejection under 35 U.S.C. 102(e) as being anticipated by Matsushita et al. (US 5,824,729)

Appellants have added claims 17 and 19-24 in the previous amendment in attempted to provoke a interfere with the claims of Matsushita, however, such interference is not granted because of the outstanding rejections under 35 U.S.C. 112, first paragraph over claims 17 and 19-24 as shown above. Matsushita is still deemed to be a proper prior art and thus the rejections are maintained.

C. Rejection under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. (US 5,824,729)

For the same reason as stated in above Section B, Matsushita is still deemed to be a proper prior art and thus the rejections are maintained.

D. Rejection under 35 U.S.C. 103(a) as being unpatentable over Dams (US 4,355,129) in view of Milbert (US 3,821,140)

Appellants assert, "a prima facie case has not been established because there is not suggestion or motivation to combine the references, and the references, alone or in combination, fail to teach or suggest all of the claims limitations."

First, Appellant argue, "[t]he references are directed to entirely different purposes--Dams to silicone rubber with improved color retention when exposed to corona discharge and Milbert to fire resistant elastomer". Thus, Appellant conclude that prior art does not suggest the desirability of the combination. The examiner disagrees. Appellants' attentions are directed to Milbert's col. 4, lines 1-9 and Dams' col. 1 lines 8-19, both references teach those silicone compositions being used in as insulating sheaths for electrical conductors, such as cables. Therefore, Milbert and Dams are analogous because they both are from the same area of endeavor of silicone composition for insulating electrical conductors and silicone compositions, and good mechanical properties and fire resistance should be sought after by Milbert and Dams. As shown in the rejection of the record, when the silicone polymers containing both vinyl and alkoxy/hydroxy groups as shown in Milbert's teaching, the silicone polymers can bond with the coupling agent through condensation and free radical polymerization reaction, the hydroxyl group containing silicone polymer also react with the oxide-type filler such as silica and alumina trihydrate directly to enhance the bonding with the filler, thus, enhance the mechanical properties of the cured silicone composition. Furthermore, Dams expressly teach a hydroxyl-containing siloxane can be used to modify the surface of filler as well. When the hydroxyl-containing siloxane is used as a coupling agent, it also function as the processing fluid. Thus, one would have been

motivated to employ the hydroxyl group containing silicone polymer as the processing fluid to Dams' silicone composition to improve the processability of Dams silicone composition before curing and to enhance the bonding between the fillers (silica and alumina trihydrate) and the silicone polymer to provide a cured rubber with improve mechanical properties.

As shown in the previous Office action mailed July 15, 2004, the amount of coupling agent can be optimized though routine experimentations and such amount is likely to fall in the range of the instant claims considering the broader range 0.01% to 1% which is conventionally used in the industry, and Examiner has cited the teaching Imahashi et al. (US 5,583,172) that the amount of a surface treating agent (coupling agent) is about 0.1 to 10 parts by weight relative to 100 parts by weight of the flame retardant (col. 3, lines 30-53). However, Appellants argue that the references are deficient for failing to disclose the claimed range of coupling agent of about 0.01% to 1% by weight of the total composition. To support their argument, Appellant cite that Imahashi only teaches the amount of coupling agent to be 0.1 to 10 parts by weight relative to 100 parts by weight of the flame retardant and thus conclude that "Imahashi provides no guidance regarding the amount of coupling agent used in the synthetic resin it describes". This is piecemeal analysis of references. One cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references. In re Keller, 208 USPQ 871 (CCPA 1981). Once the relative amounts between the rest of silicone components and filler are known, and the relative amount of filler needed to be treated and coupling agent is known, the

weight percentage of the coupling agent of based on the total composition can be calculated.

While it is held in court that "the discovery of the optimum value of the parameter is not obvious", Appellants have not provide any evidence to show that the entire claimed range of the coupling agent provides optimum property to the claims silicone composition. Appellants' attempt to compare properties of Appellants' silicone listed in Tables I-II and the properties of Milbert's silicone as listed in Tables is noted. First of all, Milbert is the secondary reference, Appellant must show criticality and unexpected results over the primary reference Dams instead. However, since Dams does not disclose the Shore A hardness, a fare comparison between Dams compositions and those of the instant claims can be not made at this point. Secondly, even if Appellants' few limited working examples provide superior Shore A hardness of about 70, such showing is not commensurate with the scope of the claims because the Specification does not disclose that the silicone compositions of the entire claimed range have Shore A hardness of about 70.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Caixia Lu

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